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09/745,074	12/20/2000	Nobuyuki Itoh	55506(840)	9273

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EXAMINER	
RUDE, TIMOTHY L	
ART UNIT	PAPER NUMBER
2883	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/745,074	ITOH ET AL.	
	Examiner	Art Unit	
	Timothy L Rude	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) *3* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

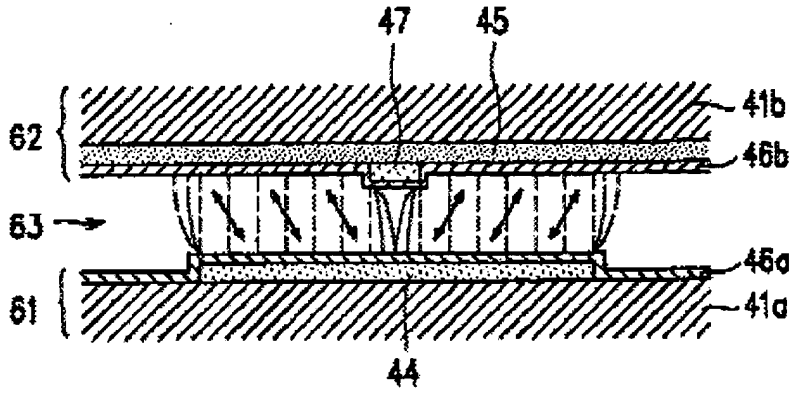
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirata et al (Hirata) USPAT 5,872,611 in view of Colgan et al (Colgan) USPAT 6,256,080 B1.

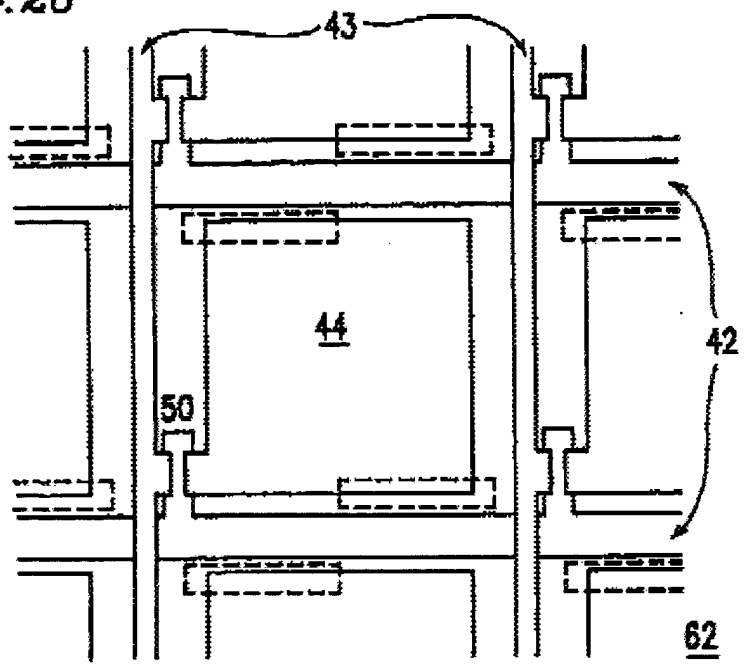
As to claim 1, Hirata discloses in example 10, (col. 18, line 21 through col. 20, line 10) and in related example 11, (col. 20, line 13 through col. 22, line 12, especially col. 20, lines 46-55), Figures 22-30, a liquid crystal display apparatus comprising: a pair of substrates, 41a and 41b, opposing each other; a liquid crystal layer, 63, interposed between the pair of substrates; at least one electrode, 44 and 45, provided on each of the pair of substrates, the at least one electrode being used for applying an electric field across the liquid crystal layer; and at least one low-permittivity insulating film, 47 (Applicant's volume excluding member), wherein:

FIG. 27



one of the at least one volume excluding member is provided on the at least one electrode on at least one of the pair of substrates, the volume excluding member being provided so as to be on at least a portion of one side edge of the at least one electrode (dashed rectangles in Figure 26); and the liquid crystal molecules are tilted in a uniform direction from the at least one side edge of the at least one electrode to an opposite edge when a voltage is applied to the at least one electrode (per double-headed arrows in Figures 22 and 27, col. 19, lines 9-19).

FIG. 26



Hirata discloses zero tilt angle (col. 19, lines 1-8), which is parallel alignment that indicates positive dielectric anisotropy, given the molecular alignments indicated in Figures 22 and 27.

Hirata does not explicitly disclose a liquid crystal layer containing liquid crystal molecules having a negative dielectric anisotropy and a side of each of the pair of substrates facing the liquid crystal layer subjected to a vertical alignment treatment.

Hirata does not explicitly disclose vertical alignment mode of operation, however, Hirata teaches that his invention, although disclosed in TN mode, is applicable to other modes of operation (col. 23, lines 60-67).

Colgan teaches the use of homeotropic alignment (Applicant's vertical alignment treatments) (col. 9, lines 50-55) and liquid crystal material with negative dielectric

anisotropy (col. 7, lines 33-38) in a display with gaps, notches, or ridges, 406 (col. 12, lines 38-47), to comprise a display with an improved wide viewing angle (Abstract).

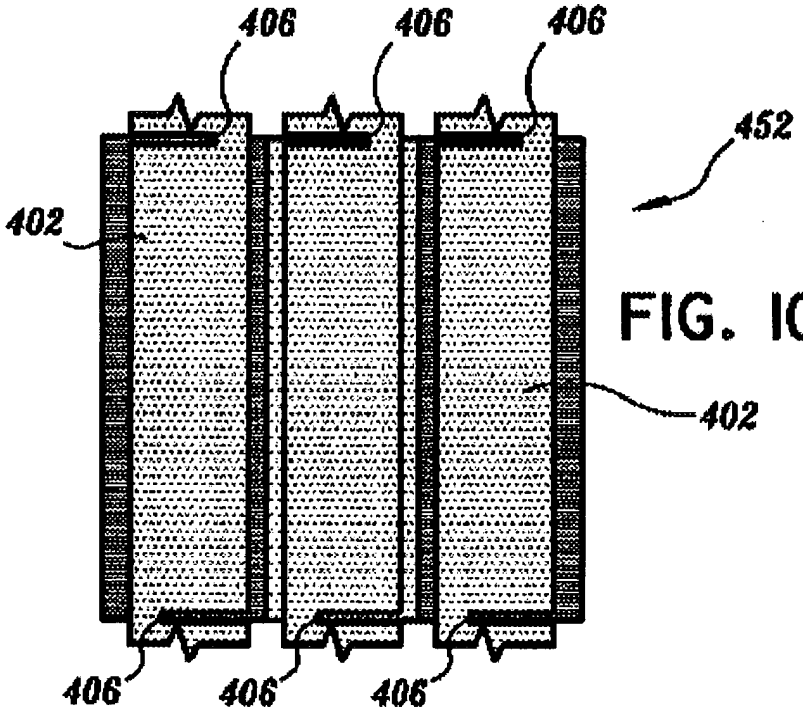


FIG. 10B

Colgan is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a liquid crystal layer containing liquid crystal molecules having a negative dielectric anisotropy and a side of each of the pair of substrates facing the liquid crystal layer subjected to a vertical alignment treatment to comprise a display with improved wide viewing angle.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Hirata with the liquid crystal layer containing liquid crystal molecules having a negative dielectric anisotropy and a side of each of the pair of substrates facing the liquid crystal layer

subjected to a vertical alignment treatment of Colgan to comprise a display with improved wide viewing angle.

As to claim 2, Hirata discloses a volume excluding member comprising a protrusion, 47, above.

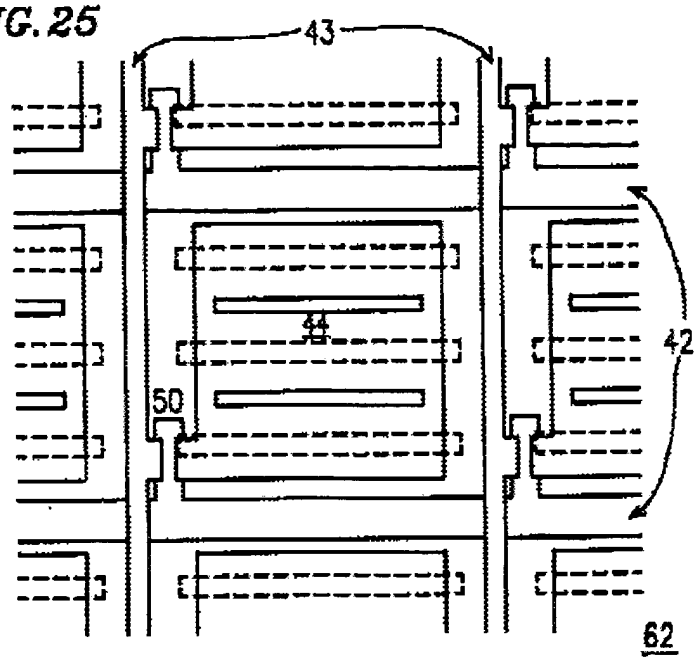
As to claim 4, Hirata in view of Colgan, as combined above, disclose the liquid crystal display as comprised above wherein: a plurality of volume excluding members provided on the at least one electrode on at least one of the pair of substrates, each of the plurality of volume excluding members being provided so as to be on at least a portion of each of an opposing pair of side edges of the at least one electrode but so as not to oppose each other (per dashed rectangles, Figure 26).

As to claim 5, Hirata in view of Colgan, as combined above, disclose the liquid crystal display as comprised above wherein: the at least one electrode on the at least one of the pair of substrates includes a first side edge and a second side edge; and the plurality of volume excluding members are provided along a portion of the first side edge and along a portion of the second side edge (per Figure 26).

As to claim 6, Hirata in view of Colgan, as combined above, disclose the liquid crystal display as comprised above wherein: slit-like openings (Applicant's non-conductive window portion) (solid rectangles in pixel region of Figure 25) is formed in

the at least one electrode on the at least one of the pair of substrates (col. 21, lines 27-32).

FIG. 25



Hirata teaches the window openings may be interchanged with the volume excluding members (col. 21, lines 28-32). Hirata teaches that the addition of more pixel dividing members (adding more volume excluding members or non-conductive windows) provides a more natural looking effect to the eye of the observer (better picture).

Hirata is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a non-conductive window portion formed in the at least one electrode on the at least one of the pair of substrates to provide a more natural looking effect to the eye of the observer (better picture).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Hirata in view of Colgan with a non-conductive window portion formed in the at least one electrode on the at least one of the pair of substrates of Hirata to provide a more natural looking effect to the eye of the observer (better picture).

2. Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirata in view of Colgan, as applied to claims 1-6 above, and further in view of Numano et al (Numano) USPAT 6,313,898 B1.

As to claims 7, 13, and 14, Hirata in view of Colgan disclose the liquid crystal display as comprised above such that when voltage is not applied to the at least one electrode, the liquid crystal molecules in the at least one pixel portion are oriented in a vertical alignment.

Hirata in view of Colgan do not explicitly disclose that the liquid crystal molecules in the non-pixel portion are oriented in a uniaxial horizontal alignment by subjecting a vertical alignment film to an irradiation of selectively polarized ultraviolet rays, wherein a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the liquid crystal molecules in the non-pixel portion.

Numano teaches in Embodiment 3 (col. 11, line 35 through col. 12, line 5) and Figures 11(a)-11(c) the use of polarized ultraviolet light to weaken the strength of the alignment layer (reducing the vertical alignment to become more horizontal in alignment) in the region between pixels to reduce cross talk and allow for a higher aperture ratio (col. 12, lines 3-5). The teachings and motivation of Numano expressed in 10 embodiments are considered to be robust to suggest the claimed invention to those having ordinary skill in the art of liquid crystals. Also, providing a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the liquid crystal molecules in the non-pixel portion would be obvious to those having ordinary skill in the art of liquid crystals to prevent light leaks and thereby improve contrast.

FIG. 11(a)

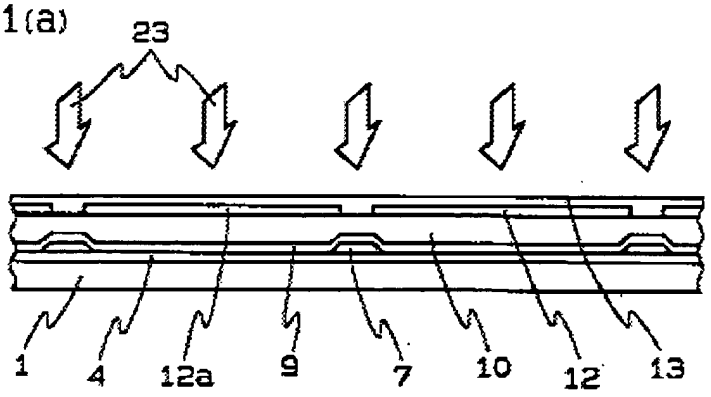


FIG. 11(b)

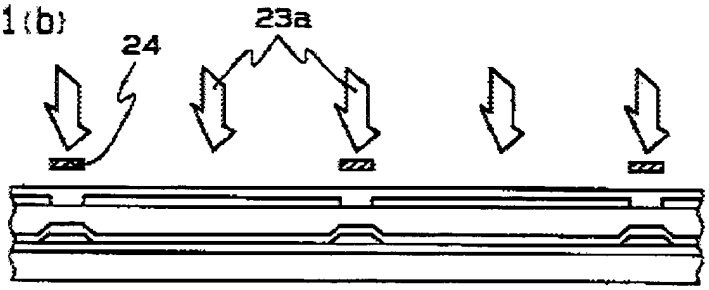
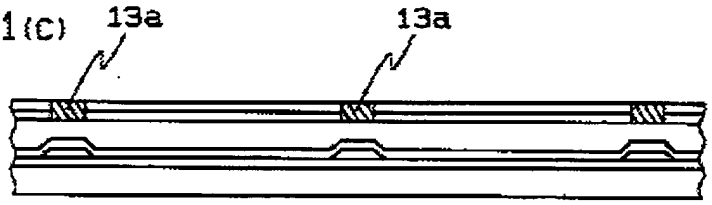


FIG. 11(c)



Numano is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to make the liquid crystal molecules in the non-pixel portion oriented in a uniaxial horizontal alignment by subjecting the existing vertical alignment film to an irradiation of selectively polarized ultraviolet rays providing a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the

liquid crystal molecules in the non-pixel portion to reduce cross talk and allow for a higher aperture ratio and to prevent light leaks and thereby improve contrast.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Hirata in view of Colgan with the liquid crystal molecules in the non-pixel portion oriented in a uniaxial horizontal alignment by subjecting the vertical alignment film to an irradiation of selectively polarized ultraviolet rays providing a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the liquid crystal molecules in the non-pixel portion of Numano to reduce cross talk and allow for a higher aperture ratio and to prevent light leaks and thereby improve contrast.

As to claim 8, Hirata discloses in example 10, (col. 18, line 21 through col. 20, line 10) and in related example 11, (col. 20, line 13 through col. 22, line 12), Figures 22-30, a liquid crystal display apparatus according to claim 7, wherein the liquid crystal molecules in the at least one pixel portion are oriented in a horizontal alignment so as to be tilted in a uniform direction when a voltage is applied to the at least one electrode (per Figures 22 and 27).

As to claims 9 and 10, Hirata discloses a volume excluding member, 47, is formed on a portion of the at least one electrode wherein said volume excluding member comprises a protrusion.

As to claim 11, Hirata discloses in example 10 a side of the at least one of the pair of substrates facing the liquid crystal layer is subjected to a rubbing treatment (col. 19, line 1). Furthermore, Colgan teaches in the Background of the Invention, the alignment of the LC molecules of the homeotrpic cells is typically provided by rubbing alignment layers (col. 3, lines 13-16).

As to claim 12, Hirata discloses in Example 11, a liquid crystal display apparatus, wherein the at least one electrode comprises a comb electrode (col. 21, lines 46-59).

3. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colgan et al (Colgan) USPAT 6,256,080 B1 in view of Hirata et al (Hirata) USPAT 5,872,611.

As to claim 1, Colgan teaches the use of homeotropic alignment (Applicant's vertical alignment treatments) (col. 9, lines 50-55) and liquid crystal material with negative dielectric anisotropy (col. 7, lines 33-38) in a display with gaps, notches, or ridges, 406 (col. 12, lines 38-47), to comprise a display with an improved wide viewing angle (Abstract).

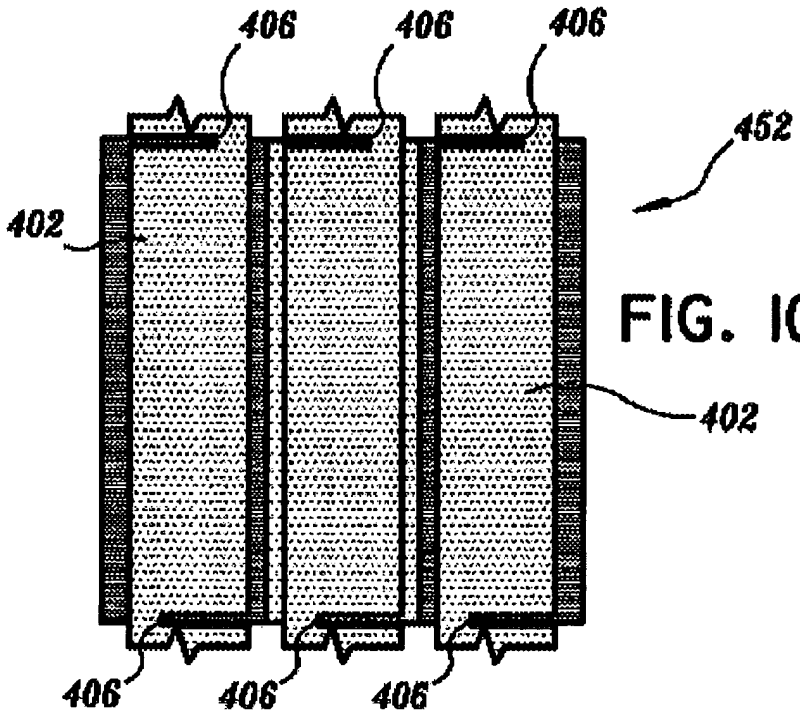


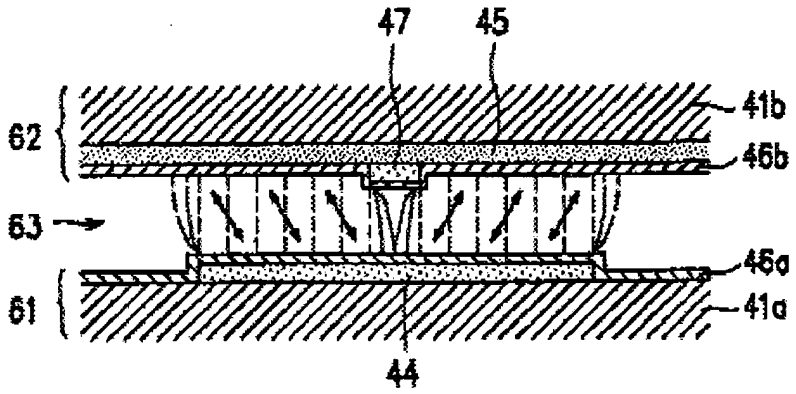
FIG. 10B

Colgan does not explicitly disclose one of the at least one volume excluding member is provided on the at least one electrode on at least one of the pair of substrates, the volume excluding member being provided so as to be on at least a portion of one side edge of the at least one electrode; and the liquid crystal molecules are tilted in a uniform direction from the at least one side edge of the at least one electrode to an opposite edge when a voltage is applied to the at least one electrode.

Hirata teaches in example 10, (col. 18, line 21 through col. 20, line 10) and in related example 11, (col. 20, line 13 through col. 22, line 12), Figures 22-30, a liquid crystal display apparatus comprising: a pair of substrates, 41a and 41b, opposing each other; a liquid crystal layer, 63, interposed between the pair of substrates; at least one electrode, 44 and 45, provided on each of the pair of substrates, the at least one

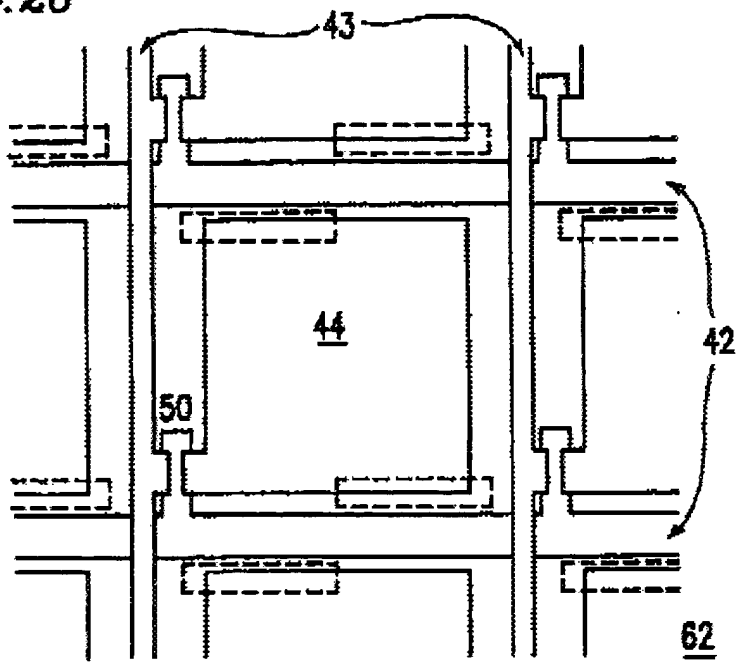
electrode being used for applying an electric field across the liquid crystal layer; and at least one low-permittivity insulating film, 47 (Applicant's volume excluding member), wherein:

FIG. 27



one of the at least one volume excluding member is provided on the at least one electrode on at least one of the pair of substrates, the volume excluding member being provided so as to be on at least a portion of one side edge of the at least one electrode (dashed rectangles in Figure 26); and the liquid crystal molecules are tilted in a uniform direction from the at least one side edge of the at least one electrode to an opposite edge when a voltage is applied to the at least one electrode (per double-headed arrows in Figures 22 and 27, col. 19, lines 9-19).

FIG. 26



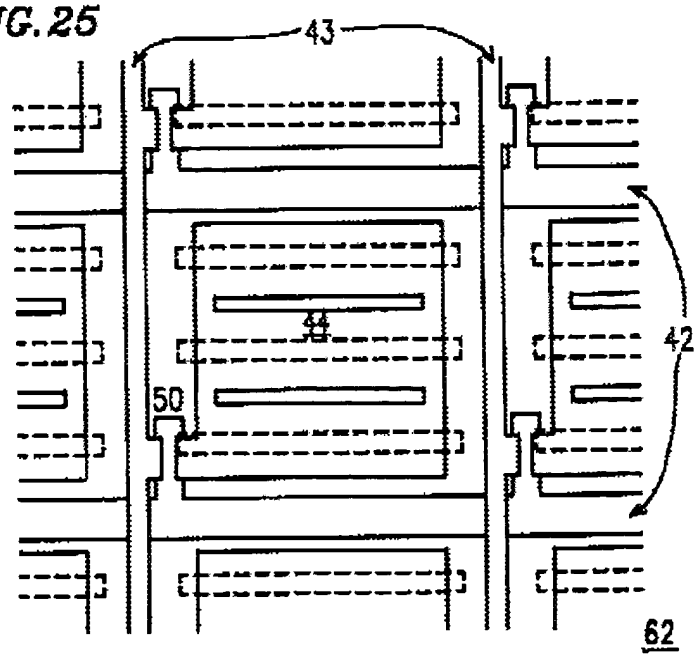
As to claim 2, Hirata, as combined to Colgan above, discloses a volume excluding member comprising a protrusion, 47, above.

As to claim 4, Colgan in view of Hirata, as combined above, disclose the liquid crystal display as comprised above wherein: a plurality of volume excluding members provided on the at least one electrode on at least one of the pair of substrates, each of the plurality of volume excluding members being provided so as to be on at least a portion of each of an opposing pair of side edges of the at least one electrode but so as not to oppose each other (per dashed rectangles, Figure 26).

As to claim 5, Colgan in view of Hirata disclose the liquid crystal display as comprised above wherein: the at least one electrode on the at least one of the pair of substrates includes a first side edge and a second side edge; and the plurality of volume excluding members are provided along a portion of the first side edge and along a portion of the second side edge (per Figure 26).

As to claim 6, Colgan in view of Hirata disclose the liquid crystal display as comprised above wherein: slit-like openings (Applicant's non-conductive window portion) (solid rectangles in pixel region of Figure 25) is formed in the at least one electrode on the at least one of the pair of substrates (col. 21, lines 27-32).

FIG. 25



Hirata, as combined above, teaches the window openings may be interchanged with the volume excluding members (col. 21, lines 28-32). Hirata teaches that the

addition of more pixel dividing members (adding more volume excluding members or non-conductive windows) provides a more natural looking effect to the eye of the observer (better picture).

Hirata is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a non-conductive window portion formed in the at least one electrode on the at least one of the pair of substrates to provide a more natural looking effect to the eye of the observer (better picture).

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Hirata in view of Colgan with a non-conductive window portion formed in the at least one electrode on the at least one of the pair of substrates of Hirata to provide a more natural looking effect to the eye of the observer (better picture).

4. Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colgan in view of Hirata, as applied to claims 1-6 above, and further in view of Numano et al (Numano) USPAT 6,313,898 B1.

As to claims 7, 13, and 14, Colgan in view of Hirata disclose the liquid crystal display as comprised above such that when voltage is not applied to the at least one electrode, the liquid crystal molecules in the at least one pixel portion are oriented in a vertical alignment.

Colgan in view of Hirata do not explicitly disclose that the liquid crystal molecules in the non-pixel portion are oriented in a uniaxial horizontal alignment by subjecting a vertical alignment film to an irradiation of selectively polarized ultraviolet rays, wherein a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the liquid crystal molecules in the non-pixel portion.

Numano teaches in Embodiment 3 (col. 11, line 35 through col. 12, line 5) and Figures 11(a)-11(c) the use of polarized ultraviolet light to weaken the strength of the alignment layer (reducing the vertical alignment to become more horizontal in alignment) in the region between pixels to reduce cross talk and allow for a higher aperture ratio (col. 12, lines 3-5). The teachings and motivation of Numano expressed in 10 embodiments are considered to be robust to suggest the claimed invention to those having ordinary skill in the art of liquid crystals. Also, providing a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the liquid crystal molecules in the non-pixel portion would be obvious to those having ordinary skill in the art of liquid crystals to prevent light leaks and thereby improve contrast.

FIG. 11(a)

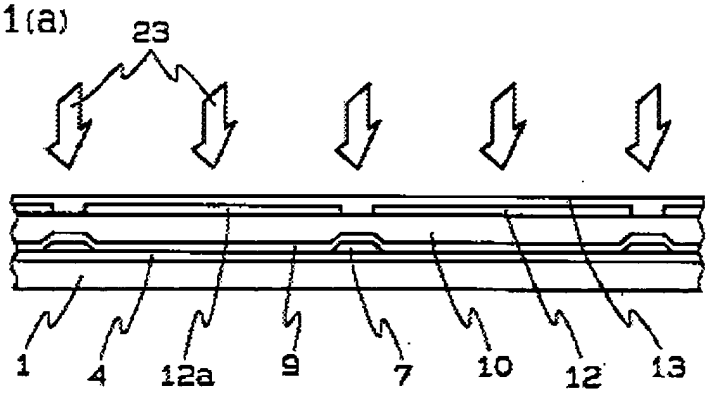


FIG. 11(b)

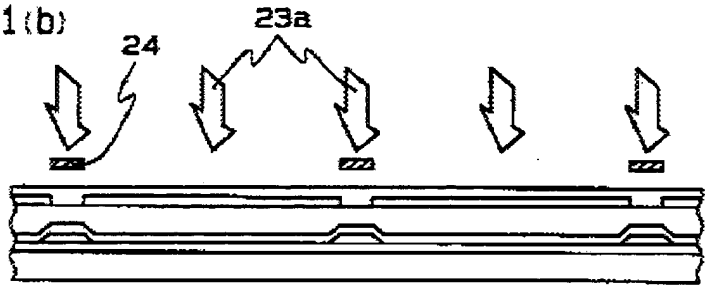
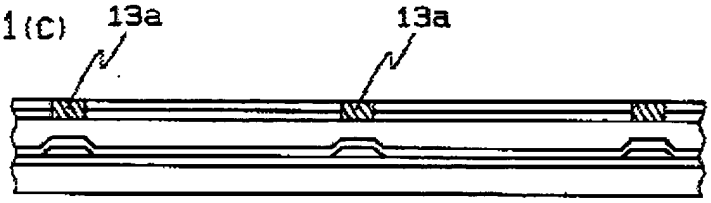


FIG. 11(c)



Numano is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to make the liquid crystal molecules in the non-pixel portion oriented in a uniaxial horizontal alignment by subjecting the existing vertical alignment film to an irradiation of selectively polarized ultraviolet rays providing a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the

liquid crystal molecules in the non-pixel portion to reduce cross talk and allow for a higher aperture ratio and to prevent light leaks and thereby improve contrast.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Colgan in view of Hirata with the liquid crystal molecules in the non-pixel portion oriented in a uniaxial horizontal alignment by subjecting the vertical alignment film to an irradiation of selectively polarized ultraviolet rays providing a direction of the horizontal alignment of the liquid crystal molecules in the at least one pixel portion is substantially identical to a direction of uniaxial horizontal alignment of the liquid crystal molecules in the non-pixel portion of Numano to reduce cross talk and allow for a higher aperture ratio and to prevent light leaks and thereby improve contrast.

As to claim 8, Hirata, as combined to Colgan above, discloses in example 10, (col. 18, line 21 through col. 20, line 10) and in related example 11, (col. 20, line 13 through col. 22, line 12), Figures 22-30, a liquid crystal display apparatus according to claim 7, wherein the liquid crystal molecules in the at least one pixel portion are oriented in a horizontal alignment so as to be tilted in a uniform direction when a voltage is applied to the at least one electrode (per Figures 22 and 27).

As to claims 9 and 10, Hirata, as combined to Colgan above, discloses a volume excluding member, 47, is formed on a portion of the at least one electrode wherein said volume excluding member comprises a protrusion.

As to claim 11, Hirata, as combined to Colgan above, discloses in example 10 a side of the at least one of the pair of substrates facing the liquid crystal layer is subjected to a rubbing treatment (col. 19, line 1). Furthermore, Colgan teaches in the Background of the Invention, the alignment of the LC molecules of the homeotropic cells is typically provided by rubbing alignment layers (col. 3, lines 13-16).

As to claim 12, Hirata, as combined to Colgan above, discloses in Example 11, a liquid crystal display apparatus, wherein the at least one electrode comprises a comb electrode (col. 21, lines 46-59).

Response to Arguments

5. Applicant's arguments filed on 08 July 2004 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

(1) Hirata's volume excluding member is in the center of the pixel.

(2) Hirata's Figure 26 has slits rather than volume excluding members.

(3) One of ordinary skill in the art of liquid crystals would not modify the TN cell of Hirata with the components disclosed by Colgan and would not obtain the claimed invention.

(4) Regarding claims 7-14, Numano does not teach VA mode and so does not resolve rejection of claims 1, 2, and 4-6.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) It is respectfully pointed out that col. 20, lines 46-55 of Hirata teach the claimed locations.

(2) It is respectfully pointed out that col. 20, lines 46-55 of Hirata teach the claimed volume excluding members.

(3) It is respectfully pointed out that the teachings of Cogan directly address the used of negative dielectric anisotropy and vertical alignment to achieve a different functionality with the motivation of improved wide viewing angle per rejections above. Therefore the reason, suggestion, and/or motivation for a departure from the functionality of Hirata is provided by Colgan and as allowed for by Hirata (col. 23, lines 60-67).

(4) It is respectfully pointed out that Numano was not applied to teach any deficiency in the rejection of claims 1, 2, and/or 4-6. Numano is considered a robust teaching with motivation to MODIFY the device of Hirata and Colgan to reduce the tilt angle between pixel areas from approximately 90 degrees to approximately parallel to reduce cross talk. Examiner considers Numano to render the claimed invention obvious to those having ordinary skill in the art of liquid crystals at the time the claimed invention was made.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tlr

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